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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,689	06/10/2005	Kouichiro Inomata	052684	6764

38834 7590 03/01/2007

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EXAMINER	
INGHAM, JOHN C	
ART UNIT	PAPER NUMBER
2814	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/538,689	INOMATA ET AL.	
	Examiner	Art Unit	
	John C. Ingham	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-50* is/are pending in the application.

4a) Of the above claim(s) *21-50* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *6/10/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 1-20 in the reply filed on 8 December 2006 is acknowledged.

Claim Objections

2. Claims 3 and 10 are objected to because of the following informalities: "said spin polarization electron" lacks antecedent basis. Appropriate correction is required.

3. Claim 7 is objected to because of the following informalities: "the first and the second magnetic layers" lacks antecedent basis. Appropriate correction is required.

4. Claims 19 and 20 are objected to because of the following informalities: "The spin injection magnetic apparatus" and "the spin injection magnetic memory" lack antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims **1-20** are rejected under 35 U.S.C. 102(b) as being anticipated by EP 1 085 586, hereinafter the '586 Pub.

7. Regarding claims **1-5**, the '586 Pub discloses in Fig 10 a spin injection device characterized in that it comprises a spin injection part having a spin polarization part (102 antiferromagnetic layer fixes the spin of layer 103) capable of tunnel junction (¶62), and an injection junction part (104, nonmagnetic insulating layer), an SyAF (105) having a first magnetic layer (105a) and a second magnetic layer (105c) having different magnitudes of magnetization (¶59), and magnetically coupled together antiparallel to each other (¶64) via a nonmagnetic layer (105b), wherein: said SyAF and said junction part are bonded, and a spin polarization electron is injected from said spin injection part, and magnetization of said first and second magnetic layers is reversed while maintained in antiparallel state (¶59).

8. Regarding claim **6**, the '568 Pub discloses in Fig 36 the device of claim 1, wherein the aspect ratio (T1/W and T2/W, ¶194) of the first and second magnetic layers of SyAf in contact with the injection junction part is less than 2.

9. Regarding claim **7**, the '586 Pub discloses in Fig 10 a spin injection magnetic apparatus characterized in that it comprises a free layer (105) having the first and second magnetic layers (105a and 105c) coupled together magnetically antiparallel to each other via a nonmagnetic layer (105b), and in which magnitudes of magnetization are different (¶59), and the magnetization of said first and second magnetic layer is capable of magnetization reversal while maintaining the antiparallel state (¶64), and a ferromagnetic fixed layer (103) tunnel-junctioned (¶62) with said free layer via an insulating layer (104), wherein said ferromagnetic fixed layer and said free layer are made to be a ferromagnetic spin tunnel junction.

10. Regarding claims **8-12**, the '586 Pub discloses in Fig 10 the apparatus of claim 7, provided with a spin injection part (102 antiferromagnetic layer fixes spin of ferromagnetic layer 103) having an injection junction part (104, nonmagnetic insulating layer) connected to said free layer (105) and a spin polarization part (102, capable of tunnel junction ¶62).

11. Regarding claim **13**, the '568 Pub discloses in Fig 36 the device of claim 7, wherein the aspect ratio (T1/W and T2/W, ¶194) of the first and second magnetic layers of SyAf in contact with the injection junction part is less than 2.

12. Regarding claim **14**, the '568 Pub discloses in Fig 7 the apparatus wherein said spin injection part (71) may be a word line.

13. Regarding claims **15-18**, the '568 Pub discloses in Fig 10 a spin injection device characterized in that: a spin injection device comprising a spin injection part having a spin polarization part (102) including a ferromagnetic fixed layer (103) and an injection junction part (104) of a nonmagnetic layer, and a ferromagnetic free layer (105 made of Co or Co alloy, ¶40) provided in contact with said spin injection part, wherein: said nonmagnetic layer is made of an insulator, a nonmagnetic layer (106 made of Ru and 0.5 to 2.5nm thick ¶41) and a ferromagnetic layers (107 of Co or Co alloy ¶40) is provided on the surface of said ferromagnetic free layer, and an electric current flows in the direction perpendicular to the film surface of said spin injection device in order to reverse a magnetization of said ferromagnetic free layer (¶59).

14. Regarding claims **19 and 20**, the '568 Pub discloses in Fig 9 a magnetic apparatus (memory device) using the spin injection device of claim 17.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Dee (US 2003/0002230, Fig 4) and Dee (US 2003/0072110) show structures similar to that of claims 7 and 17 at least.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Ingham whose telephone number is (571) 272-8793. The examiner can normally be reached on M-F, 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

John C Ingham
Examiner
Art Unit 2814

jci

HOWARD WEISS
PRIMARY EXAMINER